

IN THE DRAWINGS:

Please enter the attached corrected drawing Fig. 3, in which the legend of "Prior Art" is added, to replace Fig. 3 as originally filed. A Letter to Draftsperson is also submitted herewith.

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated March 16, 2006. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due consideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 1-15 are under consideration in this application. Claims 1, 3 and 5-6 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicant's invention. New claims 10-15 are being added to recite other embodiments described in the specification.

The claims are being amended to correct formal errors and/or to better recite or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification. Applicant hereby submits that no new matter is being introduced into the application through the submission of this response.

Formality Rejection

Fig 3 was objected to for not being labeled with a legend of "Prior Art." Claim 6 was rejection under 35 U.S.C. §112, second paragraph, as being indefinite. As indicated, the claim and drawing have been amended as required by the Examiner. Accordingly, the withdrawal of the outstanding formal objection and rejection is in order, and is therefore respectfully solicited.

Allowed Subject Matter

Claims 3-5 and 7-9 would be allowed if rewritten into independent form including limitations of the base claim and all intervening claims as indicated by the Examiner.

As claims 3 and 5 are being rewritten into independent form including limitations of the base claim and all intervening claims, and 4, 7-9 depend from claims 3 and 5, these claims are in condition for allowance.

Prior Art Rejections

Claims 1-2 were rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's Admitted Prior Art in Figs. 1-3 ("AAPA") in view of US Patent No. 6,570,867 to Robinson (hereinafter "Robinson"). This rejection has been carefully considered, but is most respectfully traversed.

A storage system of the invention (for example, the embodiment depicted in Figs. 4-5), as now recited in claim 1, comprises: a plurality of disk devices which includes a plurality of logical volumes LVOLs: a disk controller 560 (Fig. 5) including a plurality of disk control units 511-51n each of which is connectable to the plurality of disk devices, and a common mutual connecting network 530 which connects the plurality of disk control units 511-51n with each other; and a supervise processor 550/412. Each of plurality of disk control units (511-51n in Fig. 5; 401 in Fig. 4) comprises: a plurality of first/channel interfaces connectable to a host computer 500 via a storage area network 520; a plurality of second/disk interfaces 403 connectable to the plurality of disk devices; and a cache memory unit storing data temporarily. The plurality of first/channel interfaces, the plurality of second/disk interfaces and the cache memory of one of the plurality of disk control units 511-51n are connected to the plurality of first/channel interfaces, the plurality of the second/disk interfaces and the cache memory of the other ones of the plurality of disk control units by the common mutual connecting network 530 (Fig. 5). The supervise processor 550/412 monitors and calculates an access frequency from the host computer 500 to one of the plurality of logical volumes LVOLs by using a first logical path 51-61-71 (to reach LVOL#000 in 511) and a second logical path 52-63-72 (to reach LVOL#001 in 51n). The first logical path includes the storage area network 520, one of the plurality of first/channel interfaces of the one 511 of the plurality of disk control units, and one of the plurality of second interfaces of the one 511 of the plurality of disk control units (See Fig. 7). The second logical path includes the storage area network 520, one of the plurality of first/channel interfaces of the other one 51n of the plurality of the disk control units, the common mutual connecting network 530 and the one 51n of the plurality of the second interfaces of the one 51n of the plurality of disk control units (p. 14, last paragraph).

In particular, the supervise processor 550/412 monitors and calculates access frequencies deepening into the *disk-control-unit level* including an access frequency of the common mutual connecting network 530. For example, the numeral 705 in Fig. 7 denotes access from the channel of *other* unit disk controller, i.e., an access number passing through

the common mutual connecting network 530 (p. 16, lines 22-25). By comparison, the numeral 704 in Fig. 7 denotes an access number passing through the channel path in *the same* unit disk controller in the total access number (p. 16, lines 20-22) i.e., without passing via the common mutual connecting network 530.

Applicants respectfully contend that none of the cited prior art references teaches or suggests such a “supervise processor 550/412 monitoring and calculating an access frequency from the host computer 500 to one of the plurality of logical volumes LVOLs by using a first logical path 51-61-71 and a second logical path 52-63-72 including a common mutual connecting network 530 within a disk controller 560 for connecting the first/channel interfaces, the second/disk interfaces, and the cache memory of a plurality of disk control units 511-51n to one another” as the invention.

As admitted by the Examiner (p. 3, last paragraph of the outstanding Office Action), AAPA fails to teach such a supervise processor monitors and calculates an access frequency from the host computer to one of the plurality of logical volumes by using a first logical path and a second logical path.

Robinson was relied upon by the Examiner to provide such a teaching. However, Robinson’s route and path management (RPM) system only monitors “the *network-level* concepts of routes and paths (Abstract),” without monitoring the *disk-control-unit level* including an access frequency of the common mutual connecting network 530 (i.e., 705 in the Table of Fig. 7) within a disk controller 560 for connecting the first/channel interfaces, the second/disk interfaces, and the cache memory of a plurality of disk control units 511-51n to one another as the invention.

AAPA in Fig. 3 shares the same deficiencies as Robinson. Although Fig. 3 connects a plurality of the unit disk controllers by a common mutual connecting network 310 so as to construct a disk array functioning as a disk controller 315 on the whole, its SVP (Supervise Processor) part 412 only collects information on the access number per each channel path number of information transmission between the host computer 101 and the disk controller 315 without including an access frequency of the common mutual connecting network 315.

Neither AAPA, Robinson, the other references, nor their combination teaches or suggests each and every feature of the present invention as recited in independent claim 1 from which other claims depend. As such, the present invention as now claimed is distinguishable and thereby allowable over the prior art cited in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and telephone number indicated below.

Respectfully submitted,

Stanley P. Fisher
Registration Number 24,344

Juan Carlos A. Marquez
Registration Number 34,072

REED SMITH LLP
3110 Fairview Park Drive, Suite 1400
Falls Church, Virginia 22042
(703) 641-4200

April 26, 2006

SPF/JCM/JT